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Specification

1. Title of the Invention

Liquid Crystal Display Device

2. Scope of Claim

A liquid crystal display device comprising:

a first substrate provided with a transparent electrode;

a second substrate opposed to the first substrate with an appropriate gap left therebetween;

a plurality of display electrodes arranged in a matrix on the second electrode;

and

a liquid crystal composition filled in the gap,
wherein metals on said second substrate in sealing resin bonding portions at a periphery of said liquid crystal display device are the same for both a source bus electrode and a gate bus electrode.

3. Detailed Description of the Invention

Field of Industrial Application

The present invention relates to a liquid crystal display device constituted by combining a liquid crystal and a semiconductor integrated circuit.

Prior Art

A conventional liquid crystal display device is constituted as shown in FIGS. 4, 5, and 6. More specifically, a source bus side and a gate bus side have different metals on a first substrate in a sealing resin bonding portion.

Problem to be solved by the Invention

In such a conventional structure, the film thickness of a metal that is a source bus electrode is thick, and big steps are formed on the first substrate as shown in FIG. 5, and gaps are thus easily generated between the metal 3 and a sealing resin 9 when filled with the sealing resin. Although the staples have to be removed in order to prevent a liquid crystal composition 8 from escaping through the gaps, the following reason causes difficulties. More specifically, in order to remove the steps on the first substrate, the film thickness of the entire source bus electrode 3 has to be reduced or only a portion of the source bus electrode 3 in the sealing resin bonding portion has to be made thinner by etching or the like. However, reduction in the thickness of the entire source bus electrode 3 leads to increase in the resistance of the source bus electrode 3, which means that decrease in display characteristics of the liquid crystal display device. Further, the etching has the problems of increase in cost, complexity of the process, and decrease in yield since a new mask is required.

Means for Solving the Problem

In the present invention, in order to solve the problems described above, a sealing resin bonding portion for a source bus electrode 3 has a structure constituted by the same metal film as a gate bus electrode 2. [sic]

Operation of the Invention

In the present invention, the structure described above provides the sealing resin bonding portion on a first substrate to provide a shape with small steps when filled with a sealing resin. Therefore, generation of gaps between the sealing resin 9 and the metal on the first electrode will be suppressed without leading to increase in the resistance of the source bus electrode 3, increase in cost, complexity of the process, or decrease in yield.

Embodiment

One embodiment of the present invention will be described below with reference to the accompanying drawings. In FIG. 3, at the time of patterning a gate bus electrode 3, unlike the prior art (Fig. 6), a metal 4 which is the same as the gate bus electrode is patterned in a sealing resin bonding portion and its vicinity for a source bus electrode 3, and subsequently, a metal for the source bus electrode 3 is formed and patterned. In that case, the source bus electrode 3 is patterned so as not to overlap with the metal 4 which is the same as the gate bus electrode in the sealing resin bonding portion.

As described above, according to the one embodiment, it is FIGS. 1 and 2 that are cross-section views in the region of the sealing resin bonding portion, which have smaller steps on the first substrate as compared with the conventional example (FIGS. 4 and 5).

Effect of the Invention

As described above, the present invention has the structure where the metals in the sealing resin bonding portions both for the source bus electrode and the gate bus electrode are the same. By having such a structure, the present invention is able to suppress generation of gaps between the metal and the sealing resin without leading to decrease in display characteristics of the liquid crystal display device or increase in the production cost thereof.

4. Brief Description of the Drawings

FIGS. 1, 2, and 3 are respectively a cross-section view viewed from a gate bus side, a cross-section view viewed from a source bus side, and a plan view, which illustrate a liquid crystal display device in one embodiment of the present invention; and FIGS. 4, 5, and 6 are cross-section views and a plan view of a conventional liquid crystal display device.

1: glass substrate, 2: gate bus electrode, 3: source bus electrode, 4: source bus electrode in a sealing portion, 5: drain electrode, 6: insulating SiN layer, 7: α -Si layer, 8: liquid crystal inclusion, 9: sealing resin, and 10: transparent pixel electrode

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